

Docket No. 960-23-1

Amendment
Response to Office Action dated April 5, 2004
Application No. 10/696,678

REMARKS/ARGUMENTS

The foregoing amendments and these remarks are in response to the Office Action dated April 5, 2004. This amendment is accompanied by a request for a retroactive extension of time for two months, together with instructions to charge the fee therefor to Deposit Account No. 50-0951.

At the time of the Office Action, claims 1-10 were pending in the application. In the Office Action, the declaration, drawings, and the specification were objected to. Claims 2, 4, 6, 7 and 9 were rejected under 35 U.S.C. §112, second paragraph. Claims 1-6 and 8 were rejected under 35 U.S.C. §103(a). Claims 7, 9 and 10 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form, and to overcome the rejections under 36 U.S.C. §112.

I. Oath/Declaration

A replacement declaration is enclosed herewith, which identifies the present application by application number and filing date. The declaration is believed to be fully in compliance with 37 CFR §1.67(a).

II. Objections to Drawings and Specification

The drawings were objected to under 37 CFR §1.83(a) for failing to show every feature of the invention specified in the claims. In particular, limitations recited in claims 8-10 were required to be shown, or the features cancelled from the claims. Claim 8 is amended herein to cancel the objected feature. With regard to claims 9 and 10, the second gear referred to in claim 9 is gear 16, which is shown in the drawings in Figs. 1 and 2. The passage in the specification referring to this is found on page 5 line 2. In claim 10, the second clutch is shown in the drawings, at 53 (see fig. 2) and is described in the specification on page 6, line 2. The drawings are thus believed in compliance with 37 CFR §1.83(a). The specification was also objected to because of the language of the abstract and because the updated status of the parent applications was required in the "cross-reference to related application" section. The specification is duly amended herein to comply with these requirements. Withdrawal of the drawing and specification objections is respectfully requested.

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III. Claim Rejections under 35 U.S.C. § 112

Claims 2, 4, 6, and 7 have all been amended in order to provide proper antecedents and generally to meet the requirements of 35 U.S.C. § 112, second paragraph, as set out by the Examiner. In claim 4 the term "such as" has been deleted. Claim 9 was believed rejected because of its dependence upon rejected claim 2, and thus no amendment to this claim is believed necessary. Withdrawal of the 35 U.S.C. § 112, second paragraph rejection is thus respectfully requested.

IV. Claim Rejections under 35 U.S.C. § 103(a)

Claims 1, 3 to 6 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,827,146 to Yan et al ("Yan") and Japanese Patent 57-107462 to Yada. Applicant respectfully traverses this rejection.

The Office Action states that Yada shows a motor (8) connected to a countershaft and that the countershaft is connected to the ring gear. Although Yada does not show a speed variator, the Examiner has combined Yada with Yan which shows a planetary gear system with a variator. The use of an additional electric motor in Yada is quite different from that proposed in the present claims. In Yada, the motor (8) (and also the motor 15) act in a generator mode in early stages of acceleration and in a deceleration by relying on fly wheel (19). Figure 2 in Yada shows speed diagrams a, b, and c. In diagram "a" the right hand speed of the sun gear V_s and the left hand speed of the ring gear V_i are shown when V_s equals V_i and the speed of the spider V_p is 0 while the motor is turning. This is called a "singularity" situation where all power is directed through the variator. This should be avoided in power transmissions as it creates an "infinite" torque. This may destroy the bearings of the planet gears. The infinite ratio of transmission that results from this type of kinematics is even detrimental to the vehicle accelerations.

The situation presented in speed diagram b is still in a recirculation power type where V_i is in a direction opposite to V_s , and is also not an efficient option.

The diagram "c" shows a power split where V_i and V_s are in the same direction. The passage from "b" to "c" must be accomplished by stopping the electric motor (8) to block the ring gear before changing the direction of rotation.

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In claim 1 of the present application, the counter shaft and the ring gear are always rotating in the same direction, and the counter shaft is operatively connected to the sun shaft through the speed variator so that the counter shaft and the sun shaft rotate in the same direction. The control of the ring gear is accomplished entirely by the variator. The power split transmission of the present invention can function in almost all cases even if there is no power from the second motor being applied (through clutch 53). The electric motor or second motor power supply would be only in use during acceleration to avoid "spikes" during transient (speed change) condition. This is achieved by the simultaneous control of the throttle of the engine (first motor power supply) and the ratio of the transmission. The torque of the electric motor can also be modulated at the same time.

In the case of a low battery charge (which often happens in a hybrid vehicle) the power transmission of the present invention can still function without electrical torque assistance during accelerations causing only normal spikes as with other in general combustion engine systems during the transition conditions. Other systems such as Yada are not able to function properly with low battery charges.

Only minor editorial changes have been made to claim 1 herein and the Examiner is requested to reconsider the claim as submitted.

Claim 2 was rejected under 35 U.S.C. § 103(a) over Yan and Yada, and further in view of Cowan.

Cowan adds the step up gear box of the type described but does not add to the combination of Yan and Yada in respect of the invention described in claim 1.

The Applicant acknowledges that claims 7 and 9 are considered allowable by the Examiner. The Applicant also acknowledges that claim 10 which is dependent on claim 1 and which refers to a second clutch to connect the second motor power supplier to the counter shaft is considered allowable. The Applicant believes that all of the claims are patentable over the art, and early and favorable consideration is respectfully requested.

V. Conclusion

Applicant has made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. Nevertheless, Applicant invites

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the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Date: 9/7/04

Respectfully submitted,



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